REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated November 13, 2008 (U.S. Patent Office Paper No. 20081101). A Request for Continued Examination (RCE) is being submitted concurrently herewith. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

As outlined above, claims 1-2, 6-8, 12-13 and 17-22 stand for consideration in this application, wherein claims 3-5 and 9-11 are being canceled without prejudice or disclaimer, claims 1, 7, 17, 18 and 22 are being amended to more particularly point out and distinctly claim the subject invention. Support for the above-outlined amendments may be found throughout the disclosure of the invention. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formal Objections or Rejections

The Examiner objected to claims 18 and 22 for informalities, as outlined in the Office Action. Applicants have revised the claims in accordance with the Examiner's requirements. As such, this formal rejection against the claims is hereby rendered moot.

Prior Art Rejections

The Examiner rejected claims 1-2, 6-8, 12-13 and 17-22 under 35 U.S.C. §103 (a) as being unpatentable over the newly-cited Taflove et al. (US 6,292,144). Applicants have reviewed the above-outlined rejection, and hereby respectfully traverse.

The present invention as now recited in claim 1 is directed to an antenna comprising: a ground conductor having a ground potential; a single feeding point whose one end is formed by a part of the ground conductor; and a plurality of transmission lines to which RF power supplied to the feeding point is input, for radiating electromagnetic waves of a plurality of frequencies into space, wherein the plurality of transmission lines include a specific transmission line that consists of a single element without being separated by space to radiate electromagnetic waves of the plurality of frequencies into space commonly to the

plurality of frequencies, wherein impedance matching is performed at the feeding point with respect to the plurality of frequencies, and wherein when the plurality of frequencies are composed of n frequencies of first, second, third and fourth to n-th frequencies, where n is a positive integer of two or more, the total length of the plurality of transmission lines is shorter than the sum of a quarter wavelength of an electromagnetic wave of the first frequency and half wavelengths of electromagnetic waves of the second, third and fourth to n-th frequencies, the second, third and fourth to n-th frequencies being higher than the first frequency.

As set forth in claim 7, the present invention is directed to an antenna comprising: a ground conductor having aground potential; a single feeding point whose one end is formed by a part of the ground conductor; and a plurality of transmission lines to which RF power supplied to the feeding point is input, for radiating electromagnetic waves of a plurality of frequencies into space, wherein the plurality of transmission lines include a specific transmission line that consists of a single element without being separated by space to radiate electromagnetic waves of the plurality of frequencies into space commonly to the plurality of frequencies, wherein, when the plurality of frequencies are composed of two frequencies of first and second frequencies, the plurality of transmission lines include a first transmission line whose one end is connected to the feeding point and whose other end is connected to a first branching point, and a second transmission line connected to the first branching point, wherein respective lengths of the plurality of transmission lines are set so that impedance matching is performed at the feeding point with respect to the plurality of frequencies, and wherein the total length of the plurality of transmission lines is shorter than the sum of a quarter wavelength of an electromagnetic wave of the first frequency and a half wavelength of an electromagnetic wave of the second frequency, the second frequency being higher than the first frequency.

Further, the present invention as recited in claim 17 is directed to a portable wireless terminal comprising an antenna incorporated therein, the antenna comprising: a ground conductor having a ground potential; a single feeding point whose one end is formed by a part of the ground conductor and a plurality of transmission lines to which RF power supplied to the feeding point is input, for radiating electromagnetic waves of a plurality of frequencies into space, wherein the plurality of transmission lines include a specific transmission line that consists of a single element without being separated by space to radiate electromagnetic waves of the plurality of frequencies into space commonly to the plurality of frequencies,

wherein, when the plurality of frequencies are composed of two frequencies of first and second frequencies, the plurality of transmission lines include a first transmission line whose one end is connected to the feeding point and whose other end is connected to a first branching point, and a second transmission line connected to the first branching point, wherein respective lengths of the plurality of transmission lines are set so that impedance matching is performed at the feeding point with respect to the plurality of frequencies, and wherein the total length of the plurality of transmission lines is shorter than the sum of a quarter wavelength of an electromagnetic wave of the first frequency and a half wavelength of an electromagnetic wave of the second frequency, the second frequency being higher than the first frequency.

Further, as set forth in claim 18, the present invention is directed to an antenna comprising: a ground conductor having a ground potential; a single feeding point whose one end is formed by a part of the ground conductor; and a plurality of transmission lines to which RF power supplied to the feeding point is input, for radiating electromagnetic waves of a plurality of frequencies into space, wherein the plurality of transmission lines include a specific transmission line that consists of a single element without being separated by space to radiate electromagnetic waves of the plurality of frequencies into space commonly to the plurality of frequencies, wherein, when the plurality of frequencies are composed of n frequencies of first, second, third and fourth to n-th frequencies, where n is a positive integer of three or more, the plurality of transmission lines include a first transmission line whose one end is connected to the feeding point and whose other end is connected to a first branching point, a second transmission line connected between the first branching point and a second branching point, and a third transmission line connected to the second branching point, wherein respective lengths of the plurality of transmission lines are set so that impedance matching is performed at the feeding point with respect to the plurality of frequencies, and wherein the total length of the plurality of transmission lines is shorter than the sum of a quarter wavelength of an electromagnetic wave of the first frequency and each of half wavelengths of electromagnetic waves of the second, third and fourth to n-th frequencies, the second, third and fourth to n-th frequencies being higher than the first frequency.

Lastly, as set forth in claim 22, the present invention is directed to a portable wireless terminal comprising an antenna incorporated therein, the antenna comprising: a ground conductor having a ground potential; a single feeding point whose one end is formed by a

part of the ground conductor; and a plurality of transmission lines to which RF power supplied to the feeding point is input, for radiating electromagnetic waves of a plurality of frequencies into space, wherein the plurality of transmission lines include a specific transmission line that consists of a single element without being separated by space to radiate electromagnetic waves of the plurality of frequencies into space commonly to the plurality of frequencies, wherein, when the plurality of frequencies are composed of n frequencies of first, second, third and fourth to n-th frequencies, where n is a positive integer of three or more, the plurality of transmission lines include a first transmission line whose one end is connected to the feeding point and whose other end is connected to a first branching point, a second transmission line connected between the first branching point and a second branching point, and a third transmission line connected to the second branching point, wherein respective lengths of the plurality of transmission lines are set so that impedance matching is performed at the feeding point with respect to the plurality of frequencies, and wherein the total length of the plurality of transmission lines is shorter than the sum of a quarter wavelength of an electromagnetic wave of the first frequency and half wavelengths of electromagnetic waves of the second, third and fourth to n-th frequencies, the second, third and fourth to n-th frequencies being higher than the first frequency.

Among the main structural and operational features of the present invention, the present invention is characterized mainly in an antenna construction having a total length of a plurality of transmission lines that is shorter than the sum of a quarter wavelength of an electromagnetic wave of the first frequency and half wavelengths of electromagnetic waves of the second, third and fourth to n-th frequencies, wherein the second, third and fourth to n-th frequencies are higher than the first frequency. Applicants disagree with the Examiner's contentions on the grounds that (1) because of the above-mentioned antenna construction of the present invention, it is now possible to provide a part that commonly radiates the electromagnetic waves of the plurality of frequencies in an antenna operating in the plurality of frequencies, while making the size (the volume) of the total antenna small; and (2) in the antenna construction of the present invention comprising the plurality of transmission lines, the part of the transmission lines that operates for each of the plurality of frequencies and the other part of the transmission lines that does not operate for each of the plurality of frequencies are determined based on the connection system (topology) of the transmission lines. In particular, there are no spaces positioned among the plurality of transmission lines to reduce interference between the plurality of transmission lines in the present invention,

while antennas in the prior art operate in the plurality of frequencies by separately arranging the antenna elements with each other so that interference among the antenna elements may be reduced. According to the present invention, it is possible not only to reduce the volume of the total antenna but also to avoid degradation in antenna operation due to obstacles or contamination in those spaces. As the result, an improvement in the reliability the antenna's operation can be achieved.

As the Examiner points out, Taflove fails to provide any teaching or suggestion regarding the total lengths of the transmission lines that embody the antenna construction. Accordingly, Applicants will contend that the antenna of Taflove thus cannot achieve the features and advantages of the present invention as noted above.

Even more, Taflove discloses at column 3, lines 17-20 that its "multiband antenna 10 has a number of different length elongate radiator elements 121-12N, equal to the number of bands provided by the antenna", and at column 3, lines 34-37 that "ground (for both the coax and the elongate radiator elements) is a ground plane 18, generally disposed opposite the elongate radiator elements 12I-12N and separated by space." Applicants will submit that this recitation from Taflove means that Taflove's structure and operation are meant to dispose the plural "elongate radiator elements" operating in the plural frequencies separately in space with reduced interference and to form the antenna as a whole. Further, Taflove shows that it's antenna is not provided with a conductive construction radiating electromagnetic waves into space commonly in the plurality of frequencies. Though Taflove discloses that there is a feed element 14 exciting the plural "elongate radiator elements" commonly, the feed element is not a construction radiating the plural electromagnetic waves commonly. Taflove's antenna requires "space" by which the "elongate radiator elements" can have reduced interference, and that the operation of the Taflove's antenna is vulnerable to obstacles or contamination that may be conductive invading into that "space." As noted above, the antenna of the present invention does not need spaces for reducing electromagnetic interference, and thus the novel features and advantages of the present invention cannot be realized by Taflove.

Even more, since the present invention is directed to an antenna structure that eliminates "spaces" while Taflove teaches the use of such "spaces" in order to reduce interference, Applicants will contend that Taflove in actuality teaches away from the present invention. It is a well known principle that a rejection based on prior art references that contradict or teach away from the present invention is improper. ("*Where the prior art*

teaches away from the claimed invention, it cannot render the claimed invention obvious." *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 230 U.S.P.Q. 416, 420 (Fed. Cir. 1986); *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984)).

Again, Applicants will submit that, in this case, the Examiner appears to be using hindsight knowledge of the claimed invention to read elements of the claimed invention into the prior art cited without any clear showing that those elements even exist in the cited prior art. It is also well established that the Examiner is not allowed to use knowledge or hindsight gleaned from the disclosure of the present invention as a guide to support the rejection. *Panduit Corp. v. Dennison Mfg. Co.*, 227 USPQ 337, 344 (Fed. Cir. 1985). See *Para-Ordinance Mfg, Inc. v. SGS Importers Intl.*, Inc., 73 F.3d 1085, 37 USPQ2d 1237 (Fed. Cir. 1995) ("*Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor.*").

Applicant will contend that the only way one of skill in the art could achieve the present invention by relying on the teachings of Taflove would have been by relying on the disclosure of the present invention as a guide for applying the reference. It is well established that such a rejection is improper. Even considering the standards set forth under the Supreme Court's *KSR* decision, Applicant will contend that the body of prior art teachings presented by Taflove fails to (a) yield predictable results even relevant to the present invention, (b) solve any problem even remotely similar to that addressed by the present invention, or (c) show much less suggest that the present invention embodies a combination that one of ordinary skill in the art would have found "obvious to try" in light of Taflove.

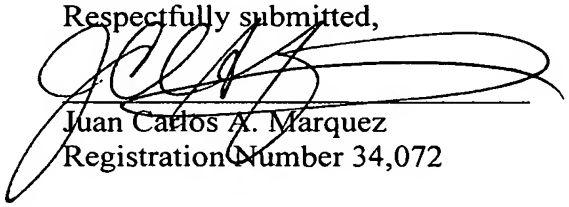
Further, in light of Taflove, Applicant will contend that there is no other evidence that could have been added that would have made Taflove more relevant to the present invention as claimed. In other words, given the teachings of Taflove, one of skill in the art would still be unable to achieve the present invention even knowing, among other things, (1) the inventor's training or education in the relevant field; (2) whether the present invention had reasonable expectation of success; (3) whether the invention was a predictable result; (4) whether the invention could have been achieved by mere routine research methodology; (5) any prior art outside of the field of the invention that allegedly solved the same problem as the invention; (6) any general technical principles and concepts found in textbooks, trade literature and other sources that would have been available to one of skill in the art; or (7) any secondary considerations under *Graham*. Rather, the present invention as a whole is distinguishable and thereby allowable over the prior art of record.

Conclusion

In view of all the above, Applicants respectfully submit that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

Respectfully submitted,



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